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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/282,274 03/31/99 MO

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EXAMINER

HU.S

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ART UNIT

PAPER NUMBER

2811

DATE MAILED:

06/13/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/282,274

Applicant(s)

Mo

Examiner

Shouxiang Hu

Group Art Unit

2811



☒ Responsive to communication(s) filed on Feb 14, 2000

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) 1-16 is/are pending in the application.

Of the above, claim(s) 11-16 is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-10 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☒ The drawing(s) filed on Mar 31, 1999 is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☒ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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DETAILED ACTION

Election/Restriction

1. Claims 11-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant's election of claims 1-10 with traverse in Paper No. 5 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Drawings

2. Drawings are objected to as Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

Specification

3. The disclosure is objected to because of the following informalities:

On Page 10, line 31, the term of "180 degree" apparently should read as --90 degree--.

On page 11, line 15, the sentence is incomplete.

Appropriate correction is required.

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Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1 is rejected as it recites the limitation "the gate". There is insufficient antecedent basis for this limitation in the claim.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

7. Claims 1-6 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Kubo et al. (5,970,344).

Kubo et al. (5,970,344) disclose a trench transistor (Fig. 6), comprising: a substrate ((11 and 12); a gate structure (15); a source contact region (a portion of 16); and, a source region (the other portion of 16), wherein the source region overlaps a portion of the gate structure and forms a p-n junction being essentially parallel to the sidewall of the trench.

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Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being obvious over Kubo et al. (5,970,344).

The disclosure of Kubo et al. (5,970,344) is discussed as applied to claims 1-6 and 8 above.

Although Kubo et al. (5,970,344) do not explicitly disclose that the thicknesses of the source region and the source contact region is no more than 0.15 microns, it is noted that the thicknesses of the source region and the source contact region are well recognized parameters of importance subject to routine experimentation and optimization.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the trench transistor of Kubo et al. (5,970,344) with the thicknesses of the source region and the source contact region being no more than 0.15 microns, so that the optimized performance for the trench transistor would be achieved.

10. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being obvious over Kubo et al. (5,970,344) in view of Applicant's admitted prior art (Fig. 1).

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The disclosure of Kubo et al. (5,970,344) is discussed as applied to claims 1-7 and 8 above.

Kubo et al. (5,970,344) further disclose that a heavily doped body (17) extending toward to the inner corner formed by the source region and the source contact region; but, do not explicitly disclose that the heavily doped body can extend substantially into the inner corner. However, Applicant's admitted prior art (Fig. 1) disclose a heavily doped body (30) extending into the inner corner formed by the source contact surface and one of the trench surface.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to make the trench transistor of Kubo et al. (5,970,344) with the heavily doped body being extended substantially into the inner corner formed by the source region and the source contact region, so that the potential parasitic bipolar transistor effect would be more effectively suppressed.

Conclusion

11. Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 or 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.


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Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to ***Shouxiang Hu*** whose telephone number is **(703) 306-5729**. The Examiner is in the Office generally between the hours of 8:00AM to 5:30PM (Eastern Standard Time) Tuesday through Friday.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **(703) 308-0956**.

Shouxiang Hu

June 8, 2000



Tom Thomas
Supervisory Patent Examiner
Technology Center 2800